Marine & Offshore Division

Certificate number: 43560/A0 BV
File number: ACI 1702/020/001
Product code: 5503H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Kidde Fenwal Inc.

Ashland - UNITED STATES OF AMERICA

for the type of product

FIXED GAS FIRE EXTINGUISHING SYSTEMS

Kidde Fire Systems ECS Advanced Delivery Fire Suppression Systems
Models 45-500201-001, 45-500351-001, 45-500601-001 and 45-500901-001 clean agent system units with 3MTm NovecTM 1230 Fire Protection Fluid

Requirements:
Bureau Veritas Rules for the Classification of Steel Ships, Part C, Chapter 4
SOLAS 74 convention as amended, Regulations II-2/10, X/3
IMO Res. MSC.36(63) -(1994 HSC Code)- as amended, 7
IMO Res. MSC.97(73) -(2000 HSC Code)- as amended, 7
IMO Res. MSC.98(73)-(FSS Code)- as amended by MSC.206(81), MSC.217(82), MSC.292(87), MSC.311(88), MSC.327(90) and MSC.339(91), 5
IMO MSC.1/Circ.1313, IMO MSC.1/Circ.1316 and IMO MSC.1/Circ.1317
IMO MSC/Circ.848 as amended by IMO MSC/Circ.1267

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 27 May 2021

For BUREAU VERITAS,
At BV PORT EVERGLADES CENTRE, on 27 May 2016,
Flavio Rosas

BUREAU VERITAS SURVEYORS AT PARIS 1828 MIAMI CENTRE INTERNATIONAL REGISTER

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Kidde Fire Systems ECS Advanced Delivery Fire Suppression Systems Models 45-500201-001, 45-500351-001, 45-500601-001 and 45-500901-001 clean agent system units with 3MTm NovecTM 1230 Fire Protection Fluid for the protection of machinery spaces and cargo pump-rooms.

The system has nominal charging capacites of 200,350, 600 and 900 lbs of 3MTm NovecTM 1230 Fire Protection Fluid.

The system uses compressed nitrogen gas to propel a separately contained, liquid extinguishing agent through distribution piping to nozzles located in the protected space.

The system mainly consists in:

- Extinguishing halocarbon clean agent
  - Trade name: "3M Novec 1230"
  - Chemical denomination: 1,1,1,2,2,4,5,5,5-NONAFLUORO-4-(TRIFLUOROMETHYL)-3-PENTANONE [L-15566]
  - Formula: C2F5C(O)CF(CF3)2
  - LOAEL: >10%
  - NOAEL: 10%
  - Design concentration Per Section 4-2.1.2 of Manual (06-237257-001) but not less than 5.85%
- Pressure vessels for Fire Protection Fluid and for Nitrogen
- Discharge nozzles.

2. DOCUMENTS AND DRAWINGS :

- Design, Installation, Operation and Maintenance ManualKidde Fire Systems® ECS Advanced Delivery Fire Suppression System Marine Series with 3M™ Novec™ 1230 Fire Protection Fluid; No 06-237257-001 dated July 2014

3. TEST REPORTS :

3.1 - Test report Ref. HAI Project #5087 issued by Hughes Associates, Inc. titled "An evaluation of 3M/TEPG total flooding NOVEC 1230 systems with the IMO Gaseous agents test protocol for machinery space applications" according to IMO MSC/Circ.848 dated 2002-07-03. Tests conducted at the US Coastguard's Fire and Safety Test Detachment in Mobile, Alabama, United States of America.

3.2 - Test report Project no. 13CA29905 File EX4674 dated November 1, 2014 by Underwriters Laboratories Inc, USA

4. APPLICATION / LIMITATION :

4.1 - Protection Index of electrical components not to be less than IP 22.

4.2 - The following documentation is to be submitted in each separate application:

4.2.1 - system design and operation principles;

4.2.2 - capacity calculations; wiring diagram and cable specifications showing cable layout, alarm circuitry and location of the release station;

4.2.3 - material specification and dimensions;

4.2.4 - control arrangement for closure of openings and stop fans;

4.2.5 - isometric drawings together with pressure loss & emission time calculation;

4.2.6 - inspection and maintenance procedures, approval documentation of flexible hoses, pressure vessels and components as per applicable regulations.

4.3 - The manufacturer of the extinguishing medium "3M Novec 1230", 3M Speciality Materials Division, USA, is to institute an appropriate quality control procedure for this product.

4.4 - The pressure vessel are to be certified by Bureau Veritas as per provisions of BV NR266, 2014 "Survey of Materials and Equipment at Works for the Classification of Ships and Offshore Units".

4.5 - Mass of NOVEC 1230 required: W = (V/s)*[c/(100-c)] where,

- V: Net volume of space to be protected ;
- s: Specific vapour volume (m3/kg) = 0.0664 + 0.000274T ;
- c: design concentration in air (0°C): Per Section 4-2.1.2 of Manual (06-237257-001) but not less than % v/v =5.85%.

4.6 - 95% of the design concentration is to be discharged in 10s or less.

4.7 - Minimum extinguishing hold time: 15 min.

4.8 - Mechanical ventilation shall be stopped before the system is operating.

4.9 - One nozzle can cover a maximum area of 10m x 10 m. 360° nozzle shall be located at the center of such area. 180° nozzle (if provided) shall be located on the sides of the protected area. The maximum height of a row of nozzles is to be 5m from the lower grating. Special attention is to be given to bilge which may need to be protected with dedicated nozzles.

4.10 - The maximum ambient operation temperature should be 55°C with a nitrogen pressure of 138 bar.

4.11 - The system is to be designed as per the annex of IMO MSC/Circ. 848 as amended by IMO MSC.1/Circ.1267.

4.12 - The pressure rating of the safety burst disc is to be less than the system storage container hydraulic test pressure.

4.13 - Suitable warning of the possible products of agent decomposition is to be displayed at the release station and on the access doors to the protected space, the minimum agent hold time as well.

4.14 - The discharge nozzles are to be so positioned that a uniform distribution of agent is obtained.

4.15 - On completion of the installation final acceptance of the system is dependant of satisfactory survey.

5. PRODUCTION SURVEY REQUIREMENTS :

The "ECS Advanced Delivery Fire Suppression Systems" are to be supplied by "Kidde Fenwal Inc**.** " in compliance with the type described in this certificate.

This type of product is within the category HBV of Bureau Veritas Rule Note NR320.

"Kidde Fenwal Inc" has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

6. MARKING OF PRODUCT :
The product or packing is to be marked with manufacturer name, type, designation and fire-technical rating.

7. OTHERS :
It is the manufacturer's responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

***** END OF CERTIFICATE *****